

State of Texas
County of Travis

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Texas Commission on Environmental Quality

Procedures to Implement the Texas Surface Water Quality Standards

Prepared by
Water Quality Division

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- For some pollutants, additional loading will not adversely affect water quality if no instream dilution is allowed, so that standards are attained at the “end-of-pipe.” This provision does not apply when a listed pollutant accumulates in bottom sediments, fish tissue, or deep layers of water. Such accumulation is typically indicated by a bioconcentration factor (BCF) equal to or greater than 1,000 or by an advisory for fish consumption.

- For discharges that withdraw from and discharge to the same listed water body, an increase in discharge flow can be allowed if it is demonstrated that the facility is simply “passing through” the pollutant of concern, so that it does not add more of the listed pollutant to the discharge effluent or cause other conditions that contribute to the violation of water quality standards.
- For discharges that are well upstream from a listed area, some pollutants, such as BOD, might be shown to completely dissipate by the time the discharge flow reaches the listed area.

Tier 2—Protecting High-Quality Waters

Applicability

Antidegradation reviews under Tier 2 ensure that where water quality exceeds the normal range of fishable/swimmable criteria, such water quality will be maintained unless lowering it is necessary for important economic or social development. The second tier of the antidegradation policy generally applies to water bodies that have existing, designated, or presumed uses of primary and secondary contact recreation and intermediate, high, or exceptional aquatic life waters. (Note that Tier 1 of the antidegradation policy applies to all water bodies, including those that are eligible for Tier 2 review.) TPDES permit amendments and new permits that allow an increase in loading are subject to review under Tier 2 of the antidegradation policy.

For Tier 2 reviews, the parameters of concern for individual water bodies may include:

- dissolved oxygen
- total dissolved solids
- sulfate
- chloride
- pH
- temperature
- toxic pollutants
- bacterial indicators of recreational suitability
- radioactive materials

- nutrients (phosphorus, nitrogen)
- taste and odor
- suspended solids
- turbidity
- foam and froth
- oil and grease
- any other constituents that could lower water quality.

Conditions that are usually not subject to an antidegradation review under Tier 2 include the following:

- Increases in pollutant loading at a specific discharge point that result from consolidating existing wastewater from other discharge points, so that overall loadings to a particular water body are not increased.
- A new or increased loading in an individual discharge that is either:
 - authorized in a waste load evaluation (WLE) or total maximum daily load (TMDL) that has been certified as an update to the Water Quality Management Plan (WQMP); or
 - authorized by a TPDES general permit, provided that a Tier 2 review was previously conducted on the WLE, TMDL, or general permit.
- A new or increased discharge authorized by a temporary or emergency order.
- New data on effluent composition indicates that a pollutant that was either (1) not previously tested for or (2) not previously detected above the agency-specified minimum analytical level (MAL) is now detected above the current MAL, and there is no proposal to increase the loading of the pollutant.

Evaluating the Potential for Degradation of Water Quality

The effect of a proposed discharge is compared to baseline water quality conditions in order to assess the potential for degradation of water quality. The applicable date for establishing baseline water quality conditions is November 28, 1975, in accordance with 40 CFR Part 131 (EPA standards regulation). Baseline conditions are estimated from existing conditions, as indicated by the latest edition of the Texas Water Quality Inventory or other available information, unless there is information indicating that degradation in ambient water quality has occurred in the receiving waters since November 28, 1975.

Analyses to assess the impact of a proposed discharge on water quality include procedures that are established in other chapters of this document, such as “Determining Water Quality Uses and Criteria” on page 14, “Evaluating Impacts on Water Quality” on page 20, and “Toxic Pollutants” on page 130.

Proposed increases in loading are initially screened to determine whether sufficient potential for degradation exists to require further analysis. This initial screening procedure does not define degradation. It is intended only as general guidance to indicate when an increase in loading is small enough to preclude the need for additional evaluation. The following guidelines are used for initial screening of existing and new discharges.

Existing Discharges

Increases in permitted loading of less than 10% over the loading allowed by the existing discharge permit are usually not considered to constitute potential degradation if: (1) the increase will attain all water quality standards, (2) the aquatic ecosystem in the area is not unusually sensitive to the pollutant of concern, and (3) the discharge is not relatively large.

The cumulative effect of repeated small increases in successive permit actions or from multiple discharges may require additional screening evaluation, even though the current permit application may be for a less than 10% increase in loading for any constituents of concern.

Increases in permitted loading of 10% or greater are not automatically presumed to constitute degradation, but will receive further evaluation.

New Discharges

New discharges that use less than 10% of the existing assimilative capacity of the water body at the edge of the mixing zone are usually not considered to constitute potential degradation as long as the aquatic ecosystem in the area is not unusually sensitive to the pollutant of concern. New discharges that use 10% or greater of the existing assimilative capacity are not automatically presumed to constitute potential degradation but will receive further evaluation. For constituents that have numerical criteria in the water quality standards, the following equation may be used to estimate changes in assimilative capacity:

$$\% \text{ change} = \frac{100 [C_p - C_a]}{C_c - C_a}$$

where: % *change* = the percent change to the assimilative capacity

C_p = the predicted concentration at the edge of the mixing zone

C_a = the ambient concentration at the edge of the mixing zone

C_c = the numerical criterion for the constituent of concern

This screening procedure is not applicable to dissolved oxygen, pH, or temperature. The screening procedure for nutrients is explained in a previous chapter of this document in the section entitled “Nutrients” beginning on page 26. Predicted concentrations at the edge of the mixing zone are calculated at applicable critical conditions using estimated effluent concentrations, which are based on available information, categorical limits, or other information. See the subsection of this document entitled “Procedure for Developing Permit Limits” on page 148 for more information on how the ambient concentration at the edge of the mixing zone is determined.

Additional Screening

If needed, additional screening is conducted to assess the potential for degradation. If proposed loadings exceed additional screening guidelines, then further evaluation is needed. The additional screening guidelines do not define degradation. The cumulative effect of repeated small increases in successive permit actions may require additional screening evaluation.

Examples Where Degradation Is Unlikely to Occur

The following examples are usually not considered to constitute degradation except where site-specific biological, chemical, or physical conditions in a water body create additional sensitivity or concern, or where background concentrations are adversely elevated:

- Increased **TSS** loading—if effluent concentrations are maintained at 20 mg/L or less.
- Increased **temperature** loading—if the “end-of-pipe” temperatures are not expected to be significantly higher than applicable instream temperature criteria.
- Increased loading of recreational indicator **bacteria**—if the applicable instream criteria are maintained in the effluent at the “end-of-pipe”.
- Increased loading of **oxygen-demanding materials**—if the dissolved oxygen in the “sag zone” is lowered by less than 0.5 mg/L from baseline instream concentrations, and if the potentially affected aquatic organisms are not unusually sensitive to changes in dissolved oxygen.
- Increased loading of constituents that affect **pH**—if the instream criteria for pH in the nearest downstream segment are attained in the effluent at the “end-of-pipe”.
- Increased loading of **TDS, chloride, or sulfate** in freshwater—if the instream criteria are attained in the effluent at the edge of the mixing zone at critical conditions.
- Increased loading of **total phosphorus, nitrate, or total nitrogen**—if it can be reasonably demonstrated that detrimental increases to the growth of algae or aquatic vegetation will not occur.
- Increased loading of **toxic pollutants** that are:
 - below concentrations that require an effluent limit based on water quality criteria or require monitoring and reporting as a permit condition.
 - not bioaccumulative (that is, the bioconcentration factor is less than 1,000).
 - not a potential cause of concern to a public drinking water supply.
 - not discharged in an area where there are aquatic organisms of unusual sensitivity to the specific toxicant of concern.

Examples Where Degradation Is Likely to Occur

The following examples are intended to provide general guidelines as to when degradation becomes likely. The examples do not define degradation, nor do they address all pollutants and situations that can cause degradation. Final determinations are case-specific and can depend on the characteristics of the water body and local aquatic communities.

Lower increases in loading may constitute degradation in some circumstances, and higher loadings may not constitute degradation in other situations. Examples where degradation is likely to occur include:

- Increased loading of **oxygen-demanding substances** that is projected to decrease dissolved oxygen by more than 0.5 mg/L for a substantial distance in a water body that has exceptional quality aquatic life and a relatively unique and potentially sensitive community of aquatic organisms.
- Increased loading of **bioaccumulative pollutants** (that is, the bioconcentration factor is greater than 1,000) that use more than 10% of the assimilative capacity at the edge of the human health mixing zone, or a substantial increase in the loading of a toxic pollutant that would directly affect an important or unusually sensitive aquatic organism.
- Increased loading of **phosphorus and/or nitrogen** into a reservoir that supplies public drinking water, if the loading would result in significant elevations in algae or potentially detrimental aquatic vegetation over a substantial area.
- A new discharge that is made directly into a tidal wetland or estuary and that would be expected to detrimentally affect **emergent or submerged vegetation** over a substantial area.
- Increased loading of TSS that would produce a visible turbidity plume extending past the designated aquatic life mixing zone.

Evaluation of Alternatives and Economic Justification

When initial and additional screening under Tier 2 preliminarily indicates that the proposed discharge is expected to degrade water quality, then the applicant is notified so that the following information can be provided to TCEQ by the applicant:

- Any additional information about the nature of the discharge and the receiving waters that could affect the evaluation of whether degradation is expected.

- An analysis of alternatives to the proposed discharge that could eliminate or reduce the anticipated degradation, and an assessment of cost and feasibility for reasonable alternatives.
- An evaluation of whether the proposed discharge will provide important economic and social development in the area where the affected waters are located, considering factors such as:

- Employment
- Increased production that improves local economy
- Improved community tax base
- Housing
- Correction of an environmental or public health problem.

Agency Review of Degradation

When degradation is anticipated, the TCEQ reviews the preliminary determination of potential degradation, the evaluation of alternatives, and economic and social justification. The TCEQ then determines whether a lowering of water quality is expected from the proposed discharge. If it is, the TCEQ then determines whether the lowering of water quality is necessary for important economic or social development and whether reasonable alternatives to the lowering of water quality are unavailable.

The TCEQ may also refer questions concerning an antidegradation review to the State Office of Administrative Hearings for further review and consideration for an administrative hearing. Any proposed TPDES permit that allows degradation is subject to EPA review and approval.

Tier 3—Outstanding National Resource Waters

Outstanding national resource waters (ONRWs) are defined in § 307.5(b)(3) of the Standards as high-quality waters within or adjacent to national parks and wildlife refuges, state parks, wild and scenic rivers designated by law, and other designated areas of exceptional recreational or ecological significance. In accordance with § 307.5(b)(3) of the Standards, the quality of such waters will be maintained and protected. No increase in pollution that could cause degradation of water quality is allowed into ONRWs.

ONRWs are specifically designated in § 307.5 of the Standards. Any designation of an ONRW should include a geographic description of the ONRW and of the applicable watershed to which the restrictions on increased loadings apply. Currently there are no designated ONRWs in Texas.